

NEARLY TWO CENTURIES OF FISH CANNING : AN HISTORICAL LOOK AT EUROPEAN EXPORTS OF CANNED FISH

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ABSTRACT

It has been recently reported that the major canned fish found in international trade –tuna- was first canned in 1903 in southern California. This US-centric view regrettably omits the important foreign trade of canned fish products borne as far back as the late 1820s in Europe, birth place of this long-lasting industry. On the basis of archives and time series on landings, foreign trade data and the number of canneries in France and Portugal, it seems interesting to develop an historical look at this important worldwide industry through various events having affected the level of trade (depletion of natural stocks, wars, colonies, international investment, industrial concentration, etc.). Sometimes, such historical events may be as important as the classical economic factors to explain the dynamics of foreign trade. Prior to many other manufactured goods, the fish canning industry has been hit by globalisation a long time ago. This historical approach provides an opportunity to discuss the present time and future of the European fish canning industry.

Key-words: fish canning industry, history, international trade, investment

INTRODUCTION

Examples of industries surviving across nearly two centuries of history without any major change in the technological process are not commonplace. This is the case of the fish canning industry. Borne with the French discovery of Nicolas Appert in 1795¹, this industry has not ceased to exist two centuries after the invention of this technical process which preserves food products for several years. This successful story is certainly due to the simplicity of the industrial process along with the low opportunity costs of processing low-valued fish species such as pelagic blue fish.

The industry has first appeared in France, where the invention was discovered [2], before settling down in many other countries (United Kingdom, Italy, Spain, Portugal, Algeria, USA, Japan, Morocco...). Although Anderson's book about the international seafood trade ([1]) remains of valuable interest by many aspects, it fails to consider the pioneering development of the European canning industry and its involvement in the international seafood trade: "In 1844, Kensett started the first large-scale oyster canning operation in Baltimore, MD. Canned oysters are considered to be the first canned seafood to receive broad distribution." ([1], p. 9). This opinion is shared by other US authors ([17], p.3). Of course, these authors acknowledged that oysters had long been processed by the same Thomas Kensett and Ezra Daggert as early as 1812 ([1], p.8), but these experiences were not developed to the level of a large-scale industry². Indeed, it is reported that "tin containers for packaging processed food were first used in the 1840s" and that "sardines were first canned in Maine about 1850" ([17], p.3).

On the other side of the Atlantic Ocean, the first sardines were packed in metal cans in Nantes (France) before 1822 by Joseph Colin³ (*Journal de Nantes et de la Loire Inférieure*, June 8th, 1822). Very little is known about the latter, except that soon after his first attempt to use the invention of Appert, he set up in Nantes an important canning factory in 1824 which failed by bankruptcy 15 years later. This cannery was able to produce at its peak in 1836 some 100 000 tins (out of which 36 000 of sardines represented approximately, with 250 g each tin, 9 tonnes in overall⁴). Canned sardines were not the only product coming out of the factory where 30 workmen (*ferblantiers*) were dedicated to the production of metal cans for further processing of meat, salmon, vegetables and fruits packed by some 300 women in high season. As far as sardines are concerned, the process was described as follows [5]:

- 1) After reception of fresh sardines, the women clean them and cover the fish with fine white salt.

- 2) After a few hours, the fish is gutted and its head cut off after that the fish has been washed again. The fish is laid down on a grill and dried by the wind or the sun in order to obtain a better shine and to avoid deterioration when it is deep fried.
- 3) The fish is fried in boiling vegetable oil and drained off. Fried sardines are then displayed in metal cans and put on tables covered with vegetable oil. The welders seal the tin cans and put them into the autoclave (pressure-cooker) for sterilisation.

It is interesting to note how little this process has changed in the course of time. Of course autoclaves have been made safer and the containers have been substantially improved (materials, easy opening system), but the production process by itself is very similar.

THE FRENCH PARTICIPATION TO THE INTERNATIONAL TRADE OF CANNED FISH IN THE 19TH CENTURY

International trade of canned fish products represented a logic outlet for such durable goods, but its emergence is reported to have taken place rather lately: “the major canned fish found in international trade, namely tuna, was first canned in 1903 in southern California” ([1], p. 9). However, in other books, international trade of canned fish is mentioned at a much earlier period of time: “by 1860 a substantial market had been created for French sardines in the United States” ([17], p.8). Indeed, several historical factors had pushed the French canning industry to export a large proportion of its production to North America by the mid 19th century (figure 1). From 40 tonnes exported as early as 1827, 400 tonnes were exported in 1844, when Kensett started its oyster canning factory in the US, and French exports of canned fish reached at their peak 17,000 t in 1879.

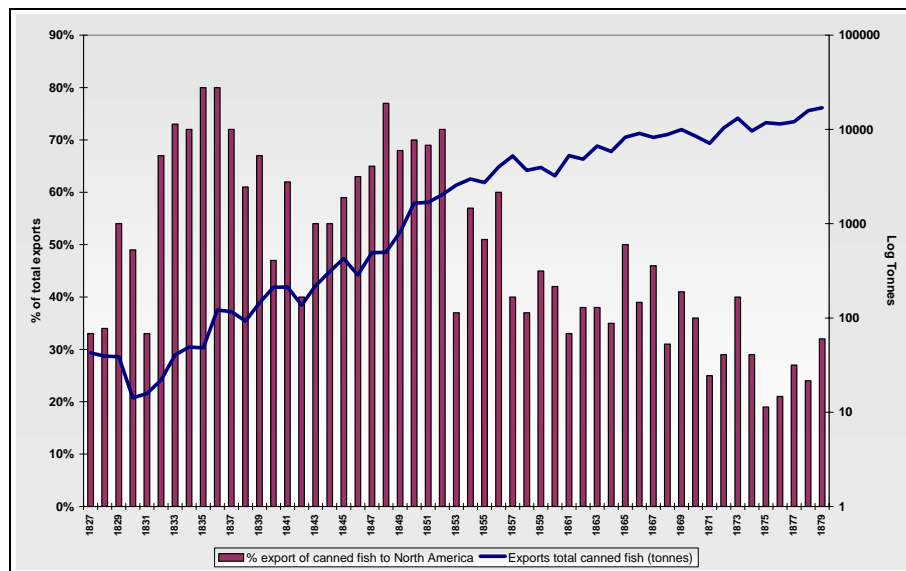


Figure 1 Exports of French canned sardines and north-American share 1827-1879

Source: Statistiques officielles des Douanes, Ministère du Commerce et de l'Industrie

Three reasons appeared as determining factors of growth for the international trade of French canned sardines in the mid 19th century: the universal Exhibition of London (1851), the discovery of gold mines in California (1848-1853) and in Australia (1851), and the implementation of a new railway between Nantes and Paris (1851) [15].

The London Exhibition represented the first universal exhibition in history and was followed by the Paris Exhibition of 1855 where a lot of industrial fish processors attended. Some of the French managers even participated to the 1853 Exhibition in New York. The gold rush of the mid-century attracted seekers from the whole world to California, seeing canned sardines as the most convenient food to take away and preserve for a long time so far from the cities. It is perhaps not so strange that some 50 years later, Booth started to can “the abundant Monterey Bay sardine”, launching in 1900 the important Californian sardine industry ([17], p. 8).

By the mid-19th century, canned sardines were still considered as a luxury good⁵, but the purchasing power of the US diggers was big enough to afford it. They even could pay for an extra 40% *ad valorem* tariff duty. In 1851, a similar gold rush in Australia produced the same effects on the development of French exports of canned sardines: 1050 million of *Francs-or* were sent from Australia to Europe between 1851 and 1855 ([16], p. 80). Finally, the new railway between Angers and Nantes on August 20th 1851 achieved to link Nantes and Paris and the harbour of Nantes itself was connected to the railway network on the 1st of January 1854.

These three combined factors boosted the level of exports that grew up at the steady growth rate of 26.7% *per annum* in quantity (and 28.8% in value) between 1847 and 1856 (*Ibid*, p. 91). North America represented the most important share for French exports, either directly (80% as early as 1832), either through the United Kingdom who increased fivefold its imports of canned sardines from France between 1852 and 1853 and re-exported them to the US market, explaining the sudden and sharp decrease of the US-French trade from that period (figure 1). The war of Crimea in 1854-55 stopped the exports to Russia but new markets appeared and exports reached new records in 1857 with 5236 tonnes.

An economic crisis hit the industry at the same period, rapidly followed by the first reduction of natural stocks in France. Simultaneously, the Civil war began in the USA (1860-1865), thus decreasing the demand for French canned sardines. From that time, even though exports may have increased for some periods, the canning industry turned preferably towards the domestic market [10], hence a growing two-way trade with the imports of foreign products (figure 2).

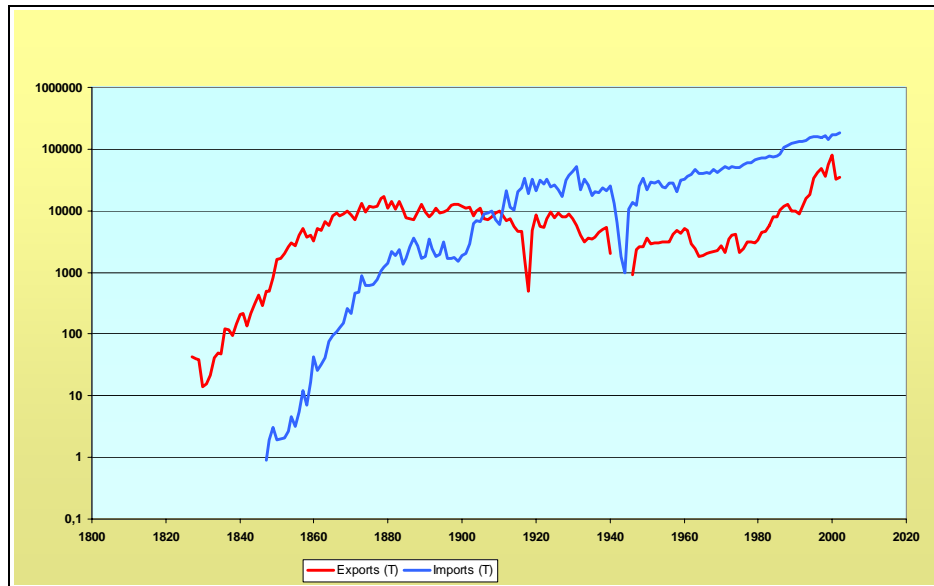


Figure 2 French exports and imports of canned fish (logarithmic scale)

Source: Statistiques officielles des Douanes, Ministère du Commerce et de l'Industrie

THE BOOM OF THE SARDINE CANNING INDUSTRY IN PORTUGAL

One could still read in the report of the international Exhibition of 1867: “The good canned fish is rare; they are well produced in Nantes and along the Ocean where powerful canneries stand. (...) Out of all the species, the canned sardines are the most commonplace, they represent a genuine French specialty. There is nowhere in the world a place that this good does not reach, for it becomes essential to consumers. It has been tried elsewhere, in Brazil, in Spain, in Italy; such more or less successful attempts cannot fight against the production of our country” (Michel Chevallier, cited in [16], p. 109-110). This self-satisfactory viewpoint has been denied by the development of a large industry abroad.

Indeed in the Paris Exhibition of 1855, the canned sardine presented by Feliciano Rocha won several awards recognizing the high quality of his products (ADS-FAC 18/1; Setubalense, 2/12/1951). In 1854, Feliciano Rocha and Manuel Neto created a fish cannery using for the first time the Appert method in Portugal (ADS-FAC 18/1, 65/2). Disagreements between the two men caused the split of the firm into two plants the same year. This

observation by Maria Quintas (2004), working on the Almeida Carvalho Archives (ADS-FAC), challenges the usual hypothesis that the creation of the Portuguese canning industry was done by a French company, namely the F. Delory company, in Setubal (Portugal) on November 16th 1880 ([8], p. 54). By the time there were several sardine canneries in Setubal that exported their products mainly to Brazil and the African colonies (ADS-FAC 18/1, several documents). French firms are not the founders of the Portuguese canning industry but helped its development with technological transfers and direct investment. The shortage of sardine in the Brittany by 1880 is the main reason of the French investments in the Portuguese canning industry. Many French companies followed the pioneering experience of Delory, such as Ogereau Frères, Chancerelle, Amieux and others (report of the Paris International Exhibition of 1889, p. 164). This transfer of capital was so important that a French chamber of commerce was created in Lisbon in 1887 ([8], p.54). A transfer of technology could also be outlined between France and Portugal at this period of time. In 1891, some 50 welders were sent to Portugal by the *Société Métallurgique de Nantes* (tin manufacturer), setting up a sort of labour aristocracy. Indeed, one of the first strikes ever occurred in canneries was led by welders in June 1897 in the Julien Company [20]. French capital and knowledge transfers to Portugal caused the change of the activity from a small-scale (phase 1 in Figure 3) to an industrial organization (phase 2 in Figure 3).

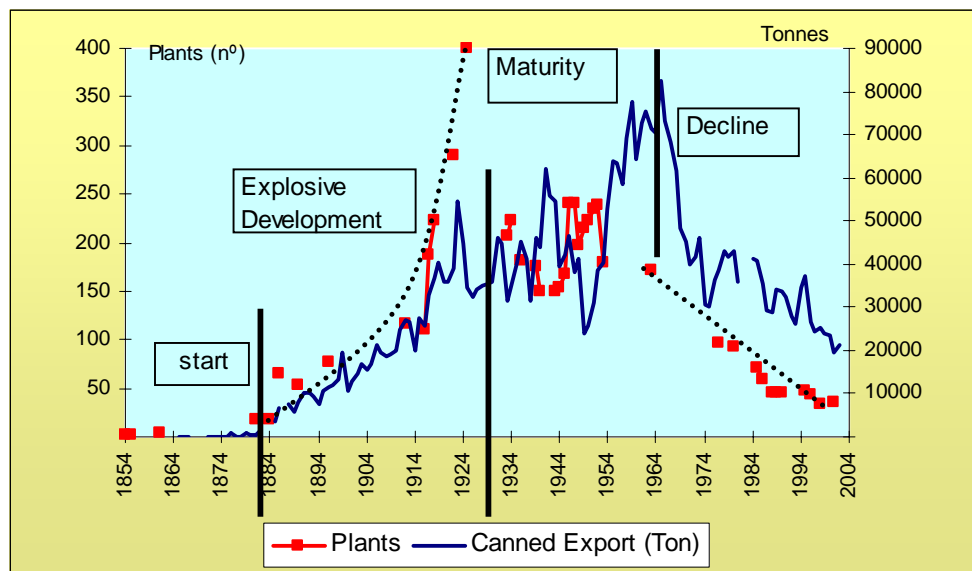


Figure 3 Portuguese exports of canned sardines

Sources: Own elaboration from several Portuguese official documents (see references)

The reasons for this important shift of comparative advantages were given as follows: “in Spain and Portugal, fish harvesting give large and constant yields, greater than those obtained in most of the French fishing zones; the catches last more or less all the year long, ten or eleven months a year near the strait of Gibraltar; sardines are sold at very low prices. To compete efficiently against so favoured competitors, our manufacturers had to settle on their rivals’ grounds. As a result, one could number only three manufacturers of Nantes who have no factory or interest in the Iberian Peninsula...” (Bouchon-Brandely 1889, cited in [16], p. 143). The above mentioned simplicity of the technical process has permitted a rapid development by imitation. In 1884, Portugal counted 18 canneries and Spain around 40; two years after, 66 factories were operating in Portugal [9].

In 1887, half of the canned sardines imported in France came from Portugal, replacing gradually the imports from the French colony in Algeria which represented the whole trade in 1879. Some 40 years later, the Portuguese leader Salazar himself, by then Minister of Finance, wrote a study on the national fish canning industry and foreign trade. His idea was to support publicly the development of exports in order to pull out the domestic industry: “if we want to stabilise or to increase exports of canned fish (...), we cannot depart from the domestic fish consumption to develop fishing, from fishing to develop the canning industry and from the canning industry to develop exports. The other way around is the natural way” ([19], p.8). By 1912, Portugal was the top worldwide exporter of canned fish. This country started to supply Spain and Brazil and gradually extended its influence on the European markets, selling canned sardines to England, France and Germany, tuna to Italy and Spain. This specialisation remains today after more than a century. One could say that Salazar played a significant role in this expansion because two Law

Acts of 1932 set up the Consorcio Portugues de Conservas de Sardinha, which became later the Consorcio Portugues de Conservas de Peixe and finally the Instituto Portugues de Conservas de Peixe. After a peak of production in 1967 with 74,000 t, the output of canned sardines has dropped to an average 50,000 t for the last 25 years. This product represents one third of the Portuguese seafood exports in value.

TWO IMPORTANT FISHING CRISES AT THE TURN OF THE 20TH CENTURY

In France, the major changes in the foreign trade of canned fish occurred after two severe depletions of sardine stocks at the turn of the 20th century. The first sardine crisis began in 1880 and ended up in 1887. All the ports hosting fish canneries saw the landings of sardines declining sharply during this period. A look back at figure 2 shows the impact this decline has had on the imports of foreign canned sardines which grew up by 159% between 1880 and 1887. This kind of depletion is typical of migratory species like sardines. Every year, the warm equatorial waters push away the colder and polar waters, fostering the migratory transgressions of the scombrid and clupeid stocks. The shoals may disappear for a while by diving deeply into the sea in order to lay⁶, but the oceanic transgressions may also result in migratory moves of the sardine stocks [13].

This is one of the hypotheses to explain that sardine stocks can disappear for several years in some areas. Other explanations, more or less serious, are suggested. The wind may push the eggs away from the sea shore. It was mainly coming from the west in the abundant years of 1978-79, but turned to East for the two next years of scarcity ([12], p.52). The temperature also appears to play a role, as shown above, and sardines often disappear after a hard winter. The fishermen believe that cetaceans like belugas may represent efficient predators competing with them for the fish. Experts have other hypotheses: sardines would be very sensitive to electricity and volcano eruptions, or even to orientation changes of marine streams (*Ibid*, p. 51). None of these is thoroughly confirmed and the chaotic dynamics of the sardine stocks keeps its part of mystery.

The second crisis was more severe and took place in the early 20th century between 1902 and 1908 and between 1911 and 1914. The average landed tonnage dropped from 32,300 t yearly on the period 1894-1901 down to 12,900 t over the period 1902-1913. As a result, the average cost of sardines doubled during this period. This period of crisis stretched the localisation of the industry to the south (in the Basque region) and boosted the Spanish and Portuguese exports to France. French imports of canned fish have increased from 2,000t per year in the period 1894-1901 to 8,900 t in the period 1902-1913.

This second crisis has definitely positioned France as a net importing country of canned fish. The trade balance has not ceased to deteriorate since 1911, with a slight improvement due to decreasing imports before the Second World War. Many canneries closed down and the overall number of factories started to decrease at the same period of time, contemporaneously with the aggravating factor of World War I. In 1917, exports were forbidden in order to secure the domestic market.

In Portugal, the emergent industry was very little affected by the periods of sardine shortage (1894-1895; 1902-1908, etc), which were noticed in the newspapers and parliamentary debates, though not observable in statistics. Indeed, till 1927, fish landings data are scarce and not reliable, because the attention was only focused on values for tax reasons. By 1912, Portugal was the first world producer and exporter of canned fish. The canning industry had grown in explosive form to account for some 400 canneries in 1925.

PROTECTION OF THE DOMESTIC INDUSTRY

The protection of a national industry by tariff and non-tariff barriers can rarely stop the decline of this industry in the long run. Curiously, the first sardine crisis and the resulting growth of imports did not push the government to increase the tariff duties, at least at the beginning. On the contrary, in 1881, the tariff charged on French imports was reduced from 31.20 FF per 100 kg to 10 FF, in spite of the domestic claims. As a comparison, the French exports were charged with an extra duty of 60-95 FF to the USA (replacing the 40% duty of the mid-19th century), 75 FF to Germany and 73.25 FF to Russia (+10% after January 1st 1881) ([16], p. 163). Why has this tariff reduction been implemented in the late 19th century context of European protectionism? Presumably, this reduction took place at the beginning of the first sardine crisis, i.e. with no previous experience of stock depletion and with the mere objective of satisfying the national demand. The Custom Law Act of 1892 changed substantially this policy by increasing the tariff from 10 FF per 100 kg to 25-30 FF (*Ibid*). The domestic supply of the market was preserved with this new measure and the national manufacturers asked the government to keep this regulation in force.

During the second crisis, the Act of July 11th 1906 protecting the canned sardines against smuggle raised the tariff level from 30 to 50 FF per 100 kg, but with a limited impact on imports because the most important supplying countries were not subject to this measure. Spain still had a 25% duty and Algeria as a French colony kept outside the regulation. Portugal, hit so far with the maximum tariff, benefited temporarily from a bilateral agreement but a new rise of the tariff reduced by twice the level of French imports from this country between 1907 and 1911. Nonetheless, in 1912, the price of the French sardine tin of 250 g fetched a price of 0.80 FF, against 0.50 FF only for the Portuguese tin. The 50 FF tariff duty per 100 kg equalled to an extra 0.125 FF cost per tin, thus not countervailing the comparative advantage of Portugal (*Ibid*, p. 242).

The July 1906 Act not only increased the French tariff barriers, but it also prohibited the imports of sardine tins heavier than 1kg, imposed the producers to report the origin of the goods on the tin cans and prohibited those “foreign commodities introduced in France or packaged with French brands or labels” ([8], p. 55). This was due to the important imitation of French brand names used by the Iberian manufacturers: *L’Hirondelle*, *Le Glouton*, *Les Savoureuses*, *La Renommée*, *L’Aigle d’Or*, *Le Faisan d’Or*... (*Ibid*, p.54). In spite of all these protectionist measures, Figure 4 shows how much the trade deficit had grown up in France since World War I.

Interestingly, the European producers of canned sardines have kept on fighting in 2000-2002 against the labels used by foreign products, like the name of sardines used by the Peruvian *Sardinops sargax* or the Venezuelan *Sardinella aurita* exported to Europe. The European producers want to maintain CEE Reg.2136/1989 that restricts the use of ‘sardine’ to the sole *Sardina pilchardus Walbaum*. The Peruvian producers obtained the authorisation of the World Trade Organisation to sell the *Sardinops sargax* as “sardines”, in respect with the Codex Alimentarius which encompasses in this category herrings, anchovies, sprats, sardinops and sardinellas. One century ago, in 1896, the *Syndicat des fabricants de conserves de Nantes* took several smugglers from New York to a US court because they were re-selling small herrings under the name of sardines and using French origin labels such as Douarnenez or Nantes (*Chambre de Commerce de Nantes, exposé des travaux*, 1896, p. 83).

In Portugal, the problem was seen in the opposite side, since the country was top World exporter. Between 1854 and 1927 there was a steady increase of canned fish exports with an explosion of small plants. Many of the small Portuguese canneries produced either very low quality products or high quality products with French brands (including those of French owners settled in Portugal⁷). The French laws about quality and conformity of the canned fish product were strictly enforced. A process of reforms started, but was interrupted by the first war, to the large benefit of Portugal. Between 1914 and 1924, exports increased by 190% in quantity, despite unstable markets – strong decreases in the UK, Germany and Brazil and increase in France).

The first war postponed a crisis caused by the excessive number of canneries and inefficient industry rules. The crisis was aggravated by the protectionism of importing countries, mainly in France, that imposed import quotas, increased the customs duties, and create incentives for consumers to discriminate against foreign products⁸. An agreement between Portugal and France was finally signed up on March 30th 1934 (*Diario Governo*, 74/1934). During the decade 1924-1934, the Portuguese exports collapsed by 23% in quantity and 30% in value. The architecture of the new Portuguese canning industry was designed by Salazar himself [19], and implemented by the Ministers of the Industry and the Sea, like Sebastião Ramirez and Henrique Tenreiro. The New State political doctrine of Salazar was based in a strong government, a corporatist industrial organisation and protectionist rules, but without the direct presence of the State as producer or trader. Laws 21621/1932 and 21622/1932 created the institutional framework where the producers association - *Consorcio Portugues de Conservas de Sardinha*- was entitled to regulate, monitor and control the quality and conformity of production and exports of canned fish. Until 1940 time was devoted to organisation and industrial discipline (phase 3 in Figure 3). Exports and production remained more or less stable in quantity but with better prices, in particular obtained by the Civil War in Spain (1936-1938).The neutrality of Portugal during the Second World War benefited to the industry not so much in quantity (greater volatility and a peak of 61,000 Tonnes in 1941), due to problems of logistics, but more in average prices (140% higher).

The end of World War II caused a natural reduction in the canned production as well as in the fishing activity, but less than ten years after the activity had fully recovered. Between 1954 and 1965, exports increased by more than 30% in quantity to reach 82,000 tonnes in 1965. During this period two apparently contradictory political measures were taken by the Salazar government: limitation for the creation of new plants (*Lei do condicionamento industrial*⁹) and the adhesion (with restrictions) to the European Free Trade Association in 1960. The shortage of sardines and the recruitment of young people to fight in the independence war in the Portuguese colonies caused a sudden 20% cut in the exports level at the end of the sixties. The political revolution of 1974 resulted in deep changes for the

economy: big strikes, loss of Portuguese colonies, state intervention in the industry and the openness to external investors, like Heinz and Ebro. More important in its effects, the integration of Portugal in the EEC had positive and negative consequences for the canneries. The main positive one was the access to European funds for the modernisation of the industry; the main negative ones were the low level of tariff duties applied to Moroccan canned sardines¹⁰, the increased bargaining power of fishermen, and the imposition of standardised safety rules.

THE DIVERSIFICATION OF THE INDUSTRY TOWARDS NEW SPECIES

Between the two Wars, France experienced a new growth of its canning industry through a diversification towards new species. The canning of North Atlantic tuna or Albacore (*Thunnus alalunga*) had started as early as during the first sardine crisis. “Then appeared a linkage of substitution between tuna and sardines processed by the canning industry: in a period of shortage of sardines or whenever they become more difficult to sell, tuna can be substituted to a certain amount. That was observed in L’Île d’Yeu in 1867” ([18], p. 185). The price of tuna may dropped from a year to another when sardines were available in large quantities, showing this substitution effect between the two species. Tuna at that time was canned in vegetable oil and was consumed as a luxury good (the price was twice that of canned sardines in 1868); tuna “*au naturel*”¹¹ has only appeared in 1936.

But this species really developed during the second sardine crisis of 1902 and after World War I. Between 1920 and 1930, canned sardines still represented 60% of the output of the French canning industry, falling down to 37% in 1937. Albacore and red tuna were not the sole responsible for this fall, since mackerel can be caught all along the French coastline during spring and summertime. These species suited all the more easily as sardines met poor fishing campaigns (around 16,000 tonnes yearly between 1919 and 1927). The economic crisis of the 1930s and World War II stopped dramatically the development of the French canning industry (see figure 2), but the industry knew a new departure in the 1950s with the discovery of important tropical tuna fisheries in the waters of the former colonies (Senegal, Côte d’Ivoire).

After a few exploratory and experimental fishing campaigns between 1948 and 1954, the Breton and Basque fishermen, followed by the Spanish fleet, went down massively to Dakar for fishing during the following winter seasons. In 1956-57, some 87 long-liners were numbered in this area, catching 13,000 tonnes of tropical tunas known as Yellowfin (*Thunnus albacares*) and skipjack (*Katsuwonus pelamis*). In 1964 were launched the more productive purse-seiners, increasing substantially the level of catches: 21,000t in 1965, 33,000 t in 1970, 48,500 t in 1975 (figure 4). The European fleets were staying all the year long or so in the African ports and some joint-ventures were created in Senegal and Côte d’Ivoire with French capital [7]. The tremendous growth of skipjack and yellowfin catches had nothing in common with the levels reached by the canning industry so far with sardines, albacore, mackerel or anchovies. After the full and stable fishing effort in the East-centre Atlantic, the first fishing campaigns started in the West Indian Ocean by the early 1980s, with the first significant tonnage of 16,000 t obtained in 1983. One year after, a great deal of effort was transferred from the Atlantic to the more fishy grounds of the Indian Ocean because catches in the latter went up from 16,000 tonnes in 1983 to 65,000 t in 1984 while those in the former dropped down from 57,000 t to 20,000 t during the same period of time (*Ibid*, p. 413). Some experimental fishing campaigns have been carried out recently by the French fleet in the Pacific Ocean where the natural stocks of skipjack and yellowfin tunas are still under-exploited. No doubt that some processing facilities would be created thereafter if the catches are satisfactory.

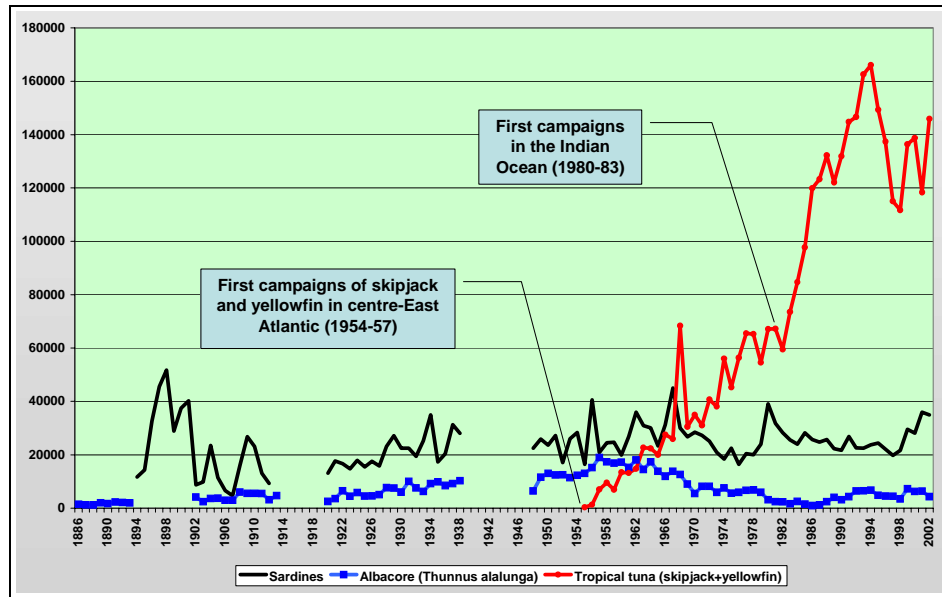


Figure 4 Catches of sardines and tuna by French* vessels, 1886-2002

Sources : Bulletin statistique des pêches maritimes and Orthongel

* Landings of sardines and Albacore in France; catches of tropical tuna by the French-owned vessels (including those fresh and frozen tuna landed in African ports)

After the emergence of the African tuna fishery and before the independence of the former colonies, the major European canneries have settled processing units overseas, close to the fishing grounds. Between 1955 and 1957, four French companies (Pêcheurs de France, Guyader et Guichard, Cassegrain-Saupiquet and a group of 5 Basque canneries) invested in new subsidiaries in Senegal. Other independent units joined them, increasing the competition for the raw materials. The leader Saupiquet, also present in Morocco at the same period, took over one after the other all these companies but Pêcheurs de France. This presence in Senegal has lasted well beyond the independence of the country, until 1988. In 1971, Saupiquet set up a new factory in Abidjan (Côte d'Ivoire). Besides Saupiquet and Pêcheurs de France, a third group (Pêche et Froid) created in 1966 its own units in Senegal, and grew up in Côte d'Ivoire in 1978. These three major groups formed for a very long time an oligopoly on the French market of canned tuna. Their activity in France or Africa was supported by two important logistic companies transporting and selling frozen tropical tuna (respectively Cobrecaf created in 1965 by André Delhemmes in Concarneau, and its subsidiary Sovetco).

In the 1980s, a similar strategy was followed by those companies chasing new natural resources in the Indian Ocean. In 1987, Pêcheurs de France set up a new factory in the Seychelles Islands (Conserverie de l'Océan Indien Ltd), with the partnership of the local government. In 1989, Pêche et Froid invested a lot of money in a big processing plant in Madagascar. Saupiquet imitated the two others only in 1996, with the launching of two large purse-seiners equipped with processing facilities onboard producing tuna loins. The US leader Starkist (Heinz group), last company to join the French oligopoly after purchasing 36% of the shares of Cobrecaf in 1978 and the cannery Paul Paulet in 1987¹², has also important canneries in Ghana (Pioneer Food Company) and in the Seychelles Islands where the company has settled in the late 1990s [14].

The consequences of this direct foreign investment are easy to imagine: a decreasing number of canneries remained in France and an important two-way trade of frozen and canned tuna took place between France and the former colonies (see figure 2). Almost all the fish caught by national vessels were landed in the overseas ports, hence being registered as exports, and processed thereafter before being re-imported. Less than 20% of the fish was processed in France. On the other hand, the major part of canned fish is marketed into Europe, either from France or Africa. For instance, in 1994, some 160,000 tonnes of frozen tuna were landed in African or Thaiandese ports and, after processing, represented about 80,000 tonnes of canned fish imported in France. Together with the 35,000 tonnes domestically produced, the fish was sold either in France (85%) or in other European countries (15%) [11]. Nowadays, the imports of whole frozen tropical tuna in France are close to zero (only the frozen cooked tuna loins are imported for further high-value processing) and international investment frames the geography of trade flows.

One could wonder why this important re-allocation process did not occur in Portugal? The first Portuguese-owned cannery in Africa was nonetheless created in Moçamedes (Angola) in 1914 by Miguel Almeida [6]. Its name was “*Fabrica Africana*” and it exported various products –canned fish, meat and vegetables - to other Portuguese colonies, to the neighbour Belgian Congo as well as canned tuna to Italy (the largest customer with 482 tonnes in 1932) and France (127 tonnes in 1933).

The main reason is political. The New State doctrine of Salazar had a paternal view of the industry. The organisational and technological innovations that could cause social troubles were restrained or not favoured, including investments abroad and migration of people to the colonies¹³. Mainly concerned with the survival of the Portuguese Empire, Salazar tried to plan an international division of labour within this empire. For instance, wine production was not allowed outside Portugal, and the same for sugar production inside Portugal. Only after 1961, when the independence war began in the African colonies, big investments were decided, including for new canneries, but this was too late! The dictatorship remained until the revolution of April 1974 and the ancient colonies plunged into destructive civil wars. Consequently for the recent period, the depletion of sardine stocks, along with competition from other countries over canned sardines, could not be compensated by a diversification of the industry towards tuna species, explaining the rapid decline of the Portuguese industry and trade for the last three decades.

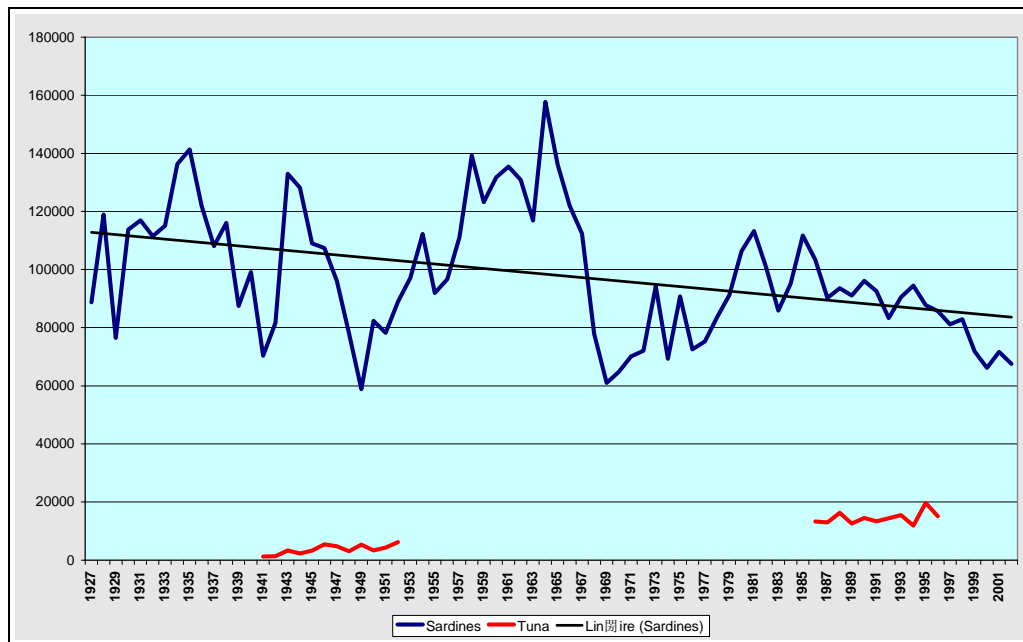


Figure 6 Catches of sardines and tuna in Portugal 1927-2002

Sources: IPCP, DGPA

FOREIGN TRADE OF CANNED FISH AND THE PRODUCT CYCLE THEORY

The last period starting with the discovery of the tropical tuna fisheries in the 1950s has seen a tremendous concentration of the industry whose number of canneries fell down sharply from 175 in 1954 to 14 in 1998 (before slightly increasing in the recent years to reach 18 in 2002). A relationship between the number of canneries and the level of foreign trade for canned fish can now be established across the whole period from the very beginning of the industry to its latest development (figure 6).

If the number of companies reflects somewhat the evolution of the market until World War II, the dynamics of trade fits remarkably with the product cycle theory of Vernon [21]. This theory tells that a new product in the early phase of development is rather exported by the innovating country, before imitation by new low-cost producers when products are standardised. Then, the companies originating from the innovative country must invest directly in the lower-cost territories in order to compete efficiently, thereby creating a two-way trade, at least for a while. The

international investment increases as the comparative advantage of the competitors gets bigger, and the trade balance may plunge into deficit. This strategy was adopted by the French manufacturers in Africa and in the Indian Ocean, whereas the US industry did the same in Puerto Rico and American Samoa Islands.

One difference could nonetheless be outlined between the historical development of the fish canning industry and Vernon's theory. Usually, the imitation comes from less developed countries as the innovating country is losing its technological advantage. As a result, a two-way trade of differentiated products takes place between the developing country exporting the low-technology good and the advanced country which imports this good and exports the new high-technology product. In the present case of canned fish, the comparative advantage does not shift because of technology, but due to factorial endowments in natural resources, in line with the Heckscher-Ohlin view. Speaking of national comparative advantages is somewhat misleading because the major part of the capital is still owned by French-based companies¹⁴, not by local owners.

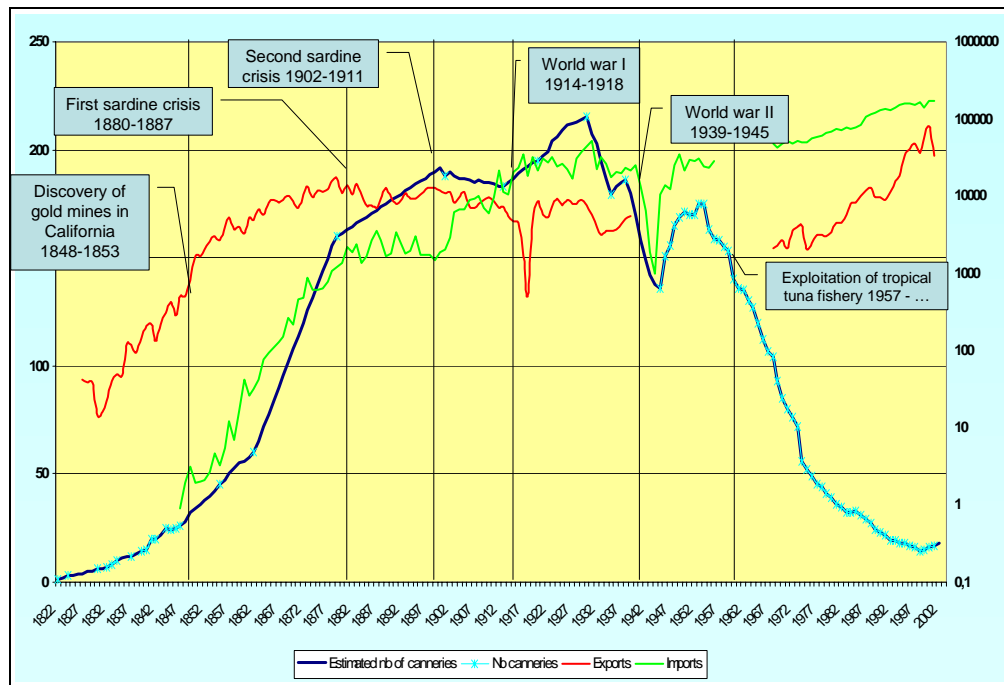


Figure 6 Number of canneries in France and foreign trade of canned fish (tonnes, log scale) 1822-2002
Own elaboration from different sources (National customs, FAO, Eurostat, FIAC, [16])

This is one major peculiarity of fish products. The specialisation process is limited by the endowment in the natural factor. As Brander and Taylor [4] pointed out in a general equilibrium model of seafood international trade, the country which specialises in open access fishery products may lose in free trade with another country specialised in manufactured goods. Looking back at the French canning history, it looks as though the sharp trade growth of canned sardines in the mid-19th century has pushed the industry beyond the maximum sustainable yield, resulting in two major harvest crises. After the loss of this comparative advantage, the national industry has only been able to recover when new resources were found in the former colonies in the mid-20th century, just before the independence, thus creating a new inflexion point with tropical tuna products on consumption markets. In the meantime, new competing countries have emerged in international trade with a stronger position in former products (mainly canned sardines). In 1997, 271,000 t of canned fish were produced in Europe, of which 50% in Spain, 28% in Italy, 14% in France and 8% in Portugal.

In the two phases of international investment, first in the 1880s-1900s in Portugal and Spain, secondly in the 1950s-1980s in Africa and the Indian Ocean, new trade flows have been created. However, if a national industry has rapidly developed autonomously in Southern Europe, this has never been the case in Western Africa or in Madagascar where the capital is still largely owned by multinational companies. Even the fish stocks are bargained

within bilateral agreements between the European Union and third countries, and managed by international commissions driven by European interests¹⁵.

One of the reasons behind this difference may rely on the tremendous concentration by mergers and acquisitions, setting up a high entry barrier for newcomers. The share of the top-4 leaders in Portuguese canneries was 57% for canned sardines and 78% for tuna in 1998. In France, the same concentration ratio is undoubtedly higher and productivity has increased five-fold for the last three decades (less than 1000 t per firm in the early 1970s to more than 5,000 t in 2000). African investors cannot afford such a high entry ticket in the industry, both for vessels and processing units. However, what have become the joint-ventures created in the early development of the European direct investment?

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ENDNOTES

¹ The invention has been rewarded by a cash prize of 12 000 Francs in 1809 after that a call for offers had been launched by Napoleon so as to obtain preserved food for his military campaigns. In 1804 Appert had his own plant in Massy (near Paris), but it was destroyed ten years later by the war [3].

² In the United Kingdom (Bermondsey), John Hall and Bryan Donkin had already preserved meat in tin containers in 1811, after that Peter Durand imported the process of Appert in 1810 and ordered them to use tin cans. As early as 1813, they became important suppliers of the Royal Navy ([8], p. 16).

³ As a matter of fact, his name was Pierre-Joseph Colin, son of Joseph Colin who was actually the first man who applied the Appert process to sardines and died in 1815. His son shortened his name to maintain the confusion with his father's name ([8], p. 13).

⁴ By 1850, more than 3 million of tins (app. 750 tonnes) were produced in France ([5], p. 69).

⁵ Salted-pressed sardines produced by the curing industry had a wholesale price of 0.40 FF per kg in 1837 and a retail price of approximately 0.90-1.00 FF/kg. The same year, the price of canned sardines reached 2.72 – 3.04 FF/kg in net weight, depending on the tin size. It proves that the two products belonged to separate markets.

⁶ The sardines require a temperature between +10 and +17°C to lay. The signal is the arrival of warm waters that make the shoals dive in the deep sea.

⁷ In its bulletin of 31/1/1912 the Setubal Industrial and Commercial Association emphasised the importance of the French legislation of 11/7/1906 that imposed the carving of the originating country on the cans. Many of the best Setubal made canned fish products like those produced by Delory were traded as French ones. Delory was sentenced by a commercial court in 13/2/1901 to pay a fine after a complaint of F. Jullien, another French firm established in Setubal.

⁸ Only the French canned fish is served as starters in the first and second classes of the boats; the foreign canned fish is for third class passengers, only (in *Portugal Exportador*, 1932, n°1).

⁹ L 2052/1952 of 24/11/1952, DL 39634/54 of 5/5/1954

¹⁰ When Portugal entered the EEC in 1986, Morocco enjoyed a free quota for their exports of canned sardines until 14,000 tonnes, a 10% duty between 10 and 20,000 tonnes and 25% above, and a duty-free rate for tuna; as compared to Portugal who faced a duty-free quota of 5,000 tonnes for canned sardines, a 8.18% rate beyond and a free quota for tuna until 1,000 tonnes with a 7.2 % rate beyond. These specific tariff duties applied to Portuguese by the EU have gradually disappeared.

¹¹ The recipe « *Au naturel* » is introduced in 1936 by M. Firmin Tristan, manufacturer in the Island of Groix (Morbihan). The raw fish is put into the tin can and covered with brine before sealing and cooking directly inside the autoclave.

¹² After a severe legal and financial fight in the mid-1990s, Starkist finally obtained the full control of Cobrecaf-Sovetco in 1995, thus becoming leader of the industry [11].

¹³ Until the sixties, a Portuguese worker had to receive a job offer from a firm in the Portuguese colonies to go there.

¹⁴ As a matter of fact, the two most important French canneries, Paulet and Saupiquet, now belong to foreign investors, respectively the US company Starkist (Heinz group) and the Italian company Trinity Alimentari (owned itself by Bolton Group, a Dutch holding) after its acquisition of Saupiquet in 1999.

¹⁵ The International Commission for the Conservation of Atlantic Tuna (ICCAT), whose headquarters are in Madrid, and the Tuna Association of the Indian Ocean.